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(54) **JIG FOR FORMING A BOX JOINT**

(76) Inventor: **Paul Freidlund**, Rosemount, MN (US)

Correspondence Address:
Angenehm Law Firm. Ltd.
P.O. Box 48755
Coon Rapids, MN 55448-0755 (US)

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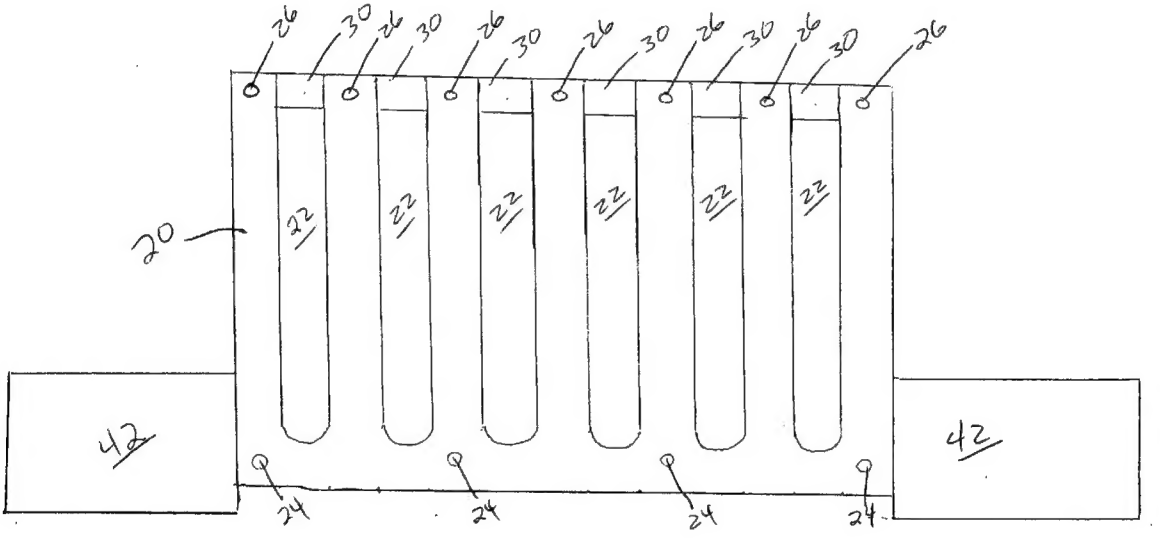
(57) **ABSTRACT**

A box joint jig, including a bottom plate; a back plate joined to the bottom plate; and an alignment member the alignment member structured to orient four boards positioned adjacent the bottom plate for a router and a method of forming a box joint, including the steps of mounting four boards in a jig; routing the boards through a groove; routing the boards through additional grooves; dismounting the boards; and joining the corners of the boards interlacing the routes cut in the boards.



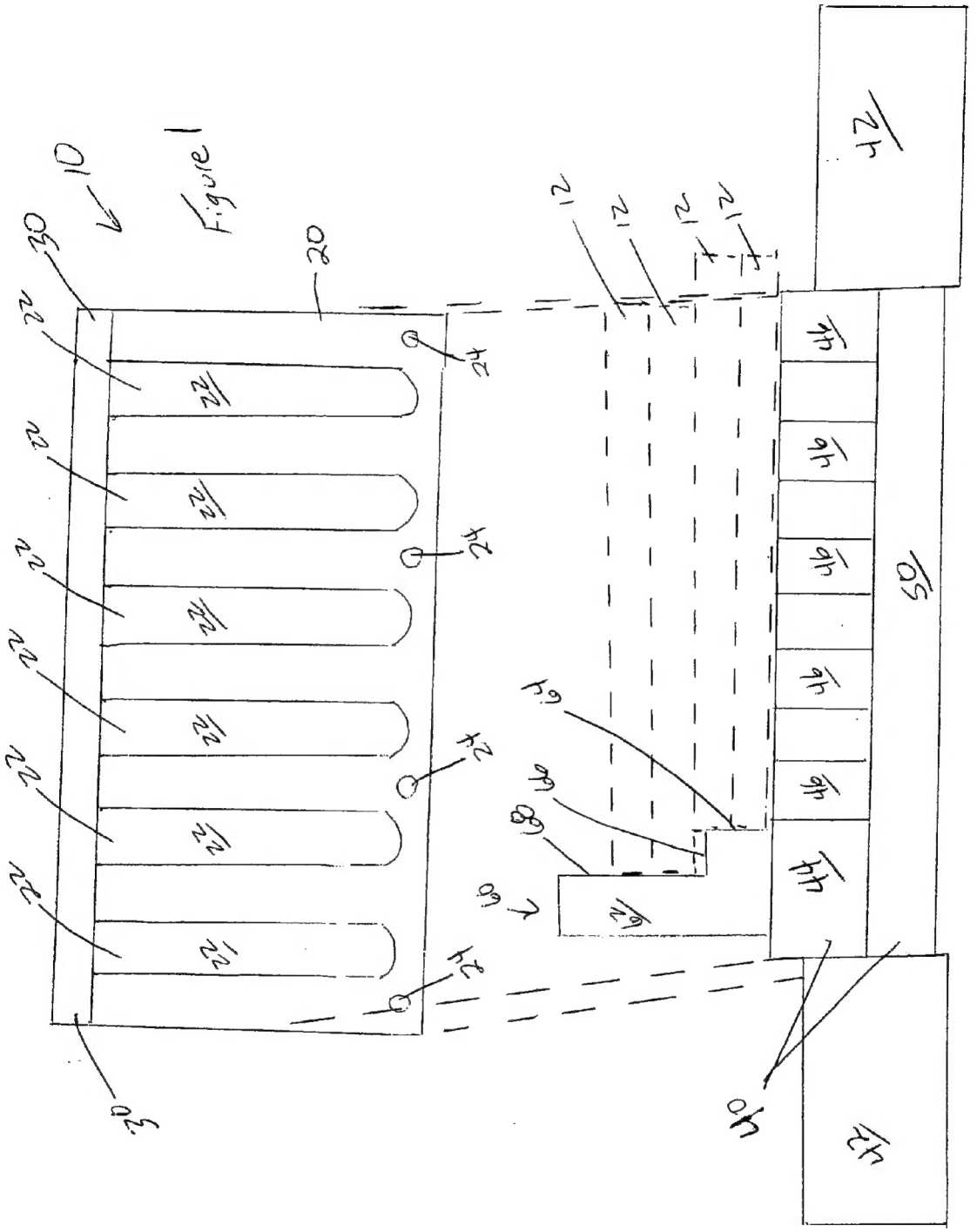


Figure 1

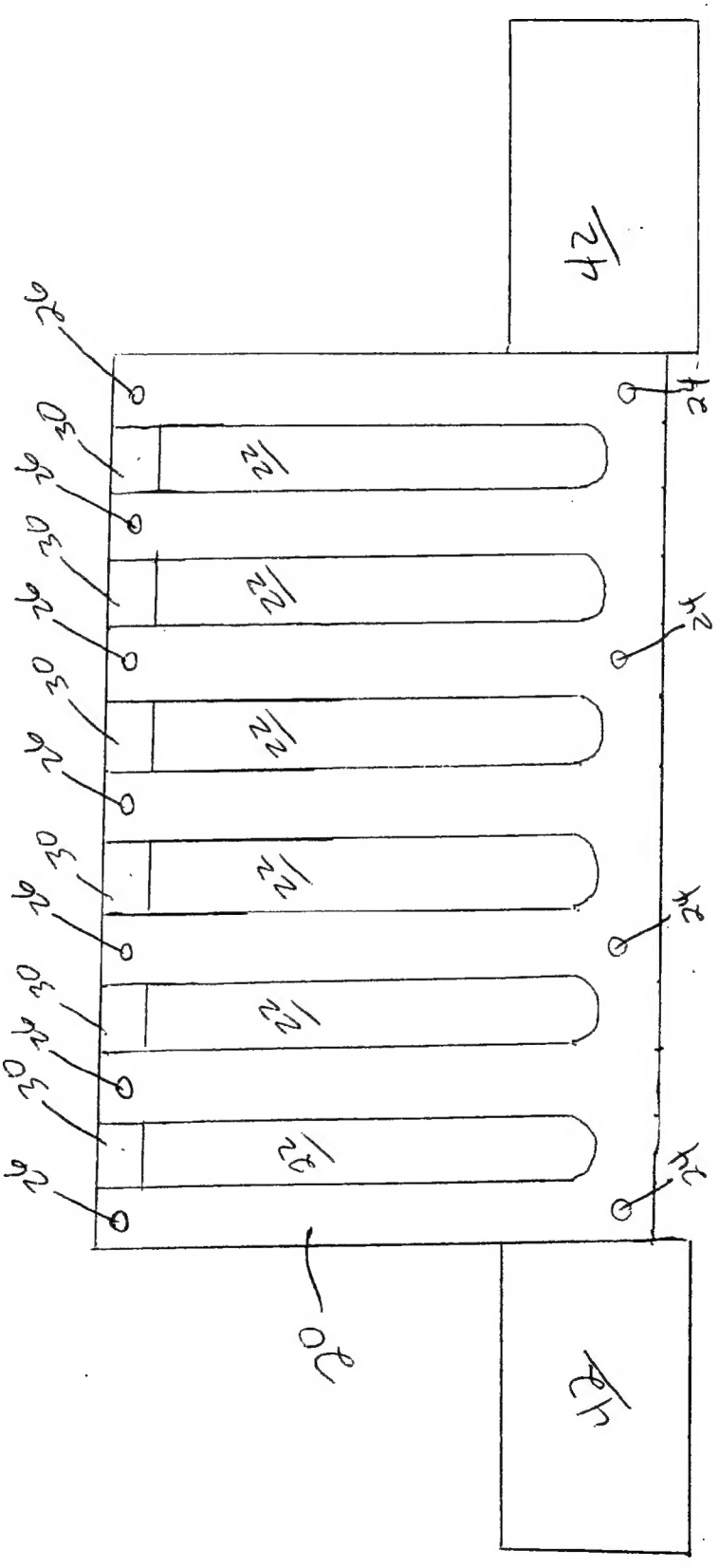


Figure 2

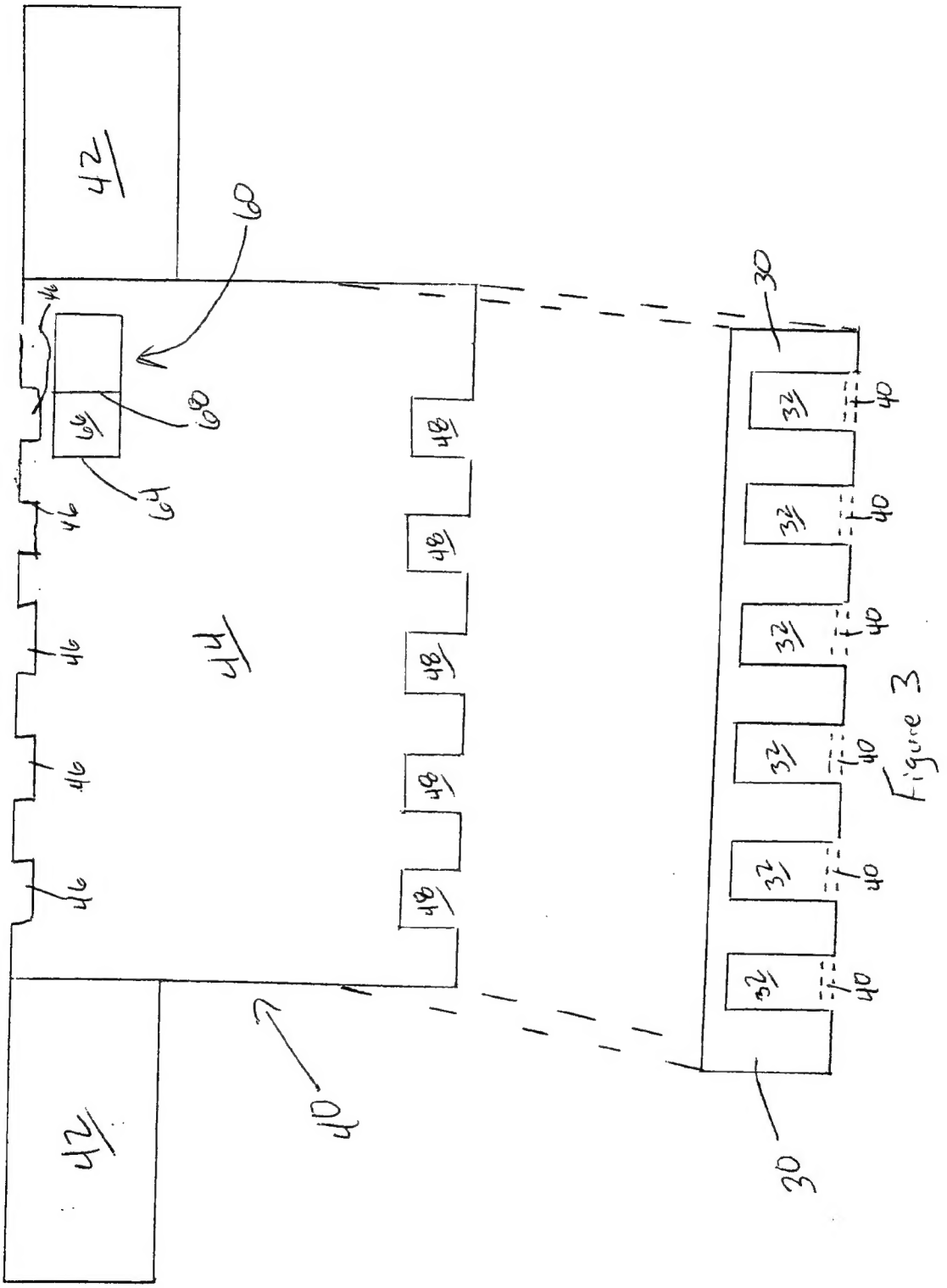


Figure 3

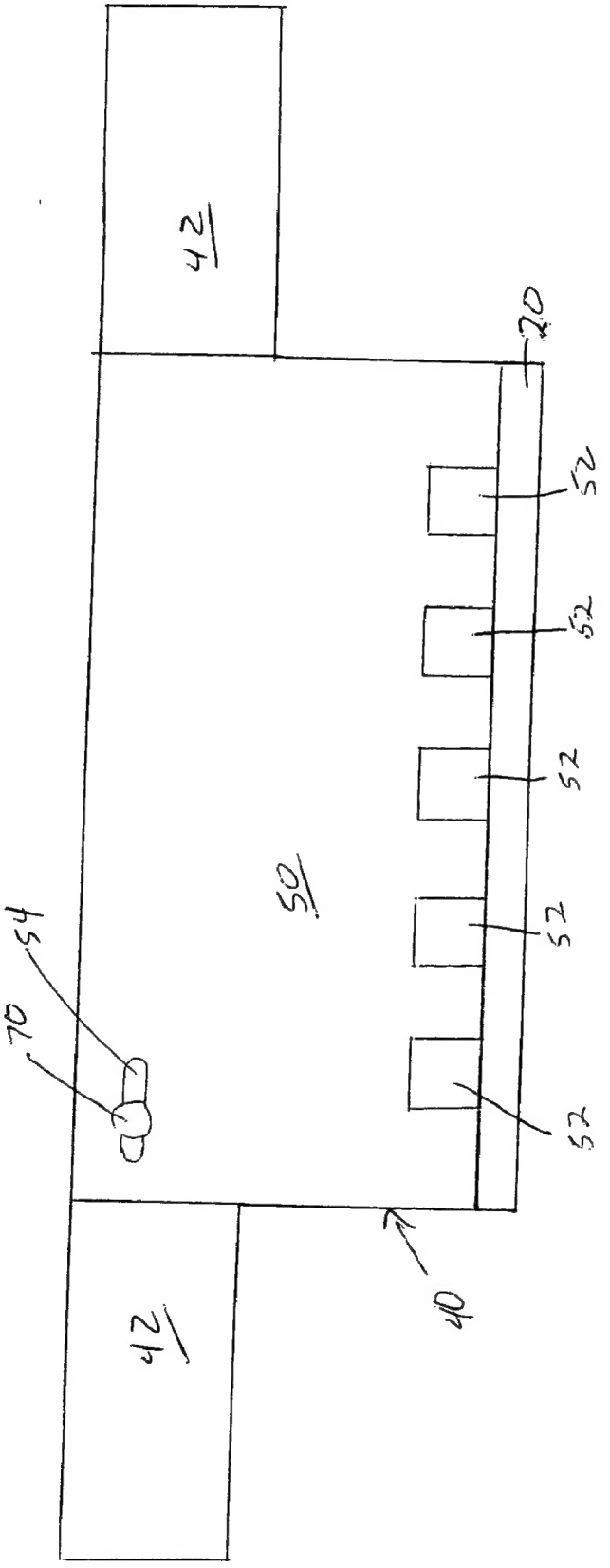


Figure 4

JIG FOR FORMING A BOX JOINT

BACKGROUND OF THE INVENTION

[0001] The present invention relates to jigs for cutting wood and related products and more specifically to jigs used to form box joints with a router.

[0002] Jigs have long been used to make repetitive cutting simpler. In a typical jig, boards or other material to be cut are uniformly laid on a jig and marked or cut at a specific location. For instance studs to be cut to a certain length may all be abutted along a straight edge. A marker of some form may be positioned at the distance away from the straight edge at which the cut is to be made. Without measuring any of the boards, the woodworker knows where to make the cut across all the boards, e.g., at the point of the marker. Jigs in essence remove the need for repeated measuring.

[0003] Various complex joints have been proposed and used for joining adjacent corners of furniture. The dove tail, box joint and many other varieties of joints have been developed in this regard. Each type of joint has certain benefits and detriments associated with the joint. Typically, these joints all suffer from complexity of cutting.

[0004] Some jigs have been proposed for cutting the box joint. These jigs generally allow only two of the four boards to be cut at the same time. Thus, the woodworker needs to adjust the jig for the first pair of boards, turn the boards over and continue cutting. Then the jig is readjusted and the process of cutting turning and cutting is repeated. If the jig is not set up correctly between the pairs of boards, wood is wasted and the process is continued until the cuts are at the right location. Moreover, these jigs typically have a maximum size of board that can be used with the jig further adding to their limitations.

[0005] What is needed is a jig that allows all four boards to be cut simultaneously. The jig should be simple to arrange, preferably mechanical, have manner of aligning the boards which does not require adjustment and be suitable to use with boards of any conceivable length.

SUMMARY OF THE INVENTION

[0006] The present invention is a jig that allows all four boards to be cut simultaneously. The jig is simple to arrange, mechanical, has manner of aligning the boards which does not require adjustment and is suitable to use with boards of any conceivable length.

[0007] The box joint jig, includes a bottom plate, a front plate, a back plate, and an alignment member. The bottom plate defines bottom grooves. The front plate, which is joined to the bottom plate, defines front grooves. The front grooves and bottom grooves are in alignment. The back plate is joined to the bottom plate. The back plate defines dust chutes with the dust chutes being aligned with the front grooves and bottom grooves. An alignment member joins either to the back plate or bottom plate. The alignment member structurally orients four boards adjacent the front and back grooves for a router.

[0008] The method of forming a box joint may include the steps of mounting four boards in a jig; routing the boards through a groove; routing the boards through additional grooves; dismounting the boards; and joining the corners of the boards interlacing the routes cut in the boards.

[0009] Advantageously, the present invention allows routing of all four boards to form box joints between the boards.

[0010] Also advantageously, the present invention provides for alignment of the boards such that the router may be moved in a straight line from one board to the next and route the boards at the correct location.

[0011] As yet a further advantage, the present invention provides a mechanism for properly aligning the boards for routing with the boards being of unlimited length.

[0012] As still another advantage, the present invention is usable with any router table, avoiding the need for additional power tools.

[0013] These and other advantages will be made clear from the detailed description below.

DESCRIPTION OF THE DRAWINGS

[0014] **FIG. 1** is an exploded top view of the present invention with boards shown in phantom;

[0015] **FIG. 2** is a bottom view of the present invention;

[0016] **FIG. 3** is an exploded front view of the present invention;

[0017] **FIG. 4** is a back view of the present invention;

[0018] **FIG. 5** is a right side view of the present invention with boards shown in phantom;

[0019] **FIG. 6** is a left side view of the present invention with boards shown in phantom;

[0020] **FIG. 7** is a perspective view of a box joint;

[0021] **FIG. 8** is an exploded view of an adapter with a router bit;

[0022] **FIG. 9** is a top view of the adapter; and

[0023] **FIG. 10** is a side view of a bottom alignment member.

DETAILED DESCRIPTION

[0024] The box joint jig **10** may include a bottom plate **20**, a front plate **30**, a back plate **40**, a back alignment member **60**, a bottom alignment member **80**, a router bit **90** and an adapter **92**. The jig **10** is used for forming box joints **14** as shown in **FIG. 7**. The jig **10** simultaneously orients four boards **12** and guides the router bit **90** such that the router bit **90** cuts the routes **16** for all four boards **12** in a single sweep. These components are discussed in serial fashion below.

[0025] The bottom plate **20** may be joined to the front plate **30** and back plate **40**. (See **FIGS. 1 and 2**). The plates **20**, **30** and **40** may be joined with fasteners **24** and **26** respectively, may be cast, molded or otherwise formed integrally, or may be joined in any other manner known in the art. The bottom plate **20** defines grooves **22**, which extend through the bottom plate **20** and provide access for the router bit to boards **12** positioned atop the bottom plate **20**.

[0026] The bottom plate **20** may be interchangable with other bottom plates **20**. The purpose of interchangability is

to allow the jig **10** to be used with different widths of router bits **90**. The width of the bottom grooves **22** in part dictate the width of routes **16** that may be cut into a board. Varying the width of the bottom grooves **22**, allows the routes to be placed closer together, e.g. smaller width of router bits **90**, or farther apart, e.g. wider width of router bits **90**.

[0027] The front plate **30** preferably is joined to the bottom plate **20**. The front plate **30** defines front grooves **32** with the front grooves **32** being in alignment with the bottom grooves **22**. The front plate **30** cradles the boards **12** when being placed into the trough area defined by the front plate **30**, back plate **40** and bottom plate **20**, preventing boards **12** from inadvertently sliding off the jig **10**.

[0028] The back plate **40** preferably is joined to the bottom plate **20**. The back plate **40** in combination with the bottom plate **20** defines dust chutes **52**. The dust chutes **52** are aligned with the front grooves **32** and bottom grooves **22**, allowing recently cut saw dust to exist through the back of the jig **10**. Handles **42** preferably are joined to the back plate **40**, such that the wood worker, guiding the jig **10** on a router table, has a manner to grip the jig **10** where their hands are away from the router bit **90**. The back plate **40** may include a guide board **44** and a back support **50**. The guide board **44** defines grooves **48**, which are in alignment with the front grooves **32**, bottom grooves **22**, and dust chutes **52**. The guide board **44** may have visual guide grooves **46** that allow the wood worker to visually sight where the routes **16** will be cut on the opposite edge of the boards **12**. The back plate **40** may define an alignment aperture **54** discussed more fully with regard to the back alignment member **60**.

[0029] The alignment member may be structured to orient four boards **12** positioned adjacent the bottom plate **20** for simultaneous routing. The alignment member may be a back alignment member **60** or a bottom alignment member **80**. The alignment member is structured to orient four boards **12**, in two offset pairs, adjacent the front and bottom grooves **32**, **42** for a router. That is, each alignment member holds the boards **12** in a position such that all four boards of a box may be simultaneously routed in a position that allows the boards to be joined to each other in a box joint.

[0030] The back alignment member **60** is joined to the back plate **40**. A block **62**, with an extended wall **64**, a connecting wall **66** and an inset wall **68**, may be joined with a fastener extending through the alignment aperture **54** to the back plate **40**. The extended wall **64** is positioned to offset two boards **12** from two boards **12** biased against the inset wall an amount equal to the width of the route **16**. In this manner, the routes **16** on two boards **12** will be positioned on the unrouted parts **18** of the other two boards **12** and vice versa. That is, the routes **16** and unrouted parts **18** are perfectly positioned on all four boards **12** to interlock as shown in **FIG. 7**. The connecting wall **66** is of the same width as the width of the router bit **90** and may corresponds to the width of the bottom grooves **22** in accordance with the discussion below concerning the groove engagement segment **98** of the adapter **92**.

[0031] The alignment member may be a bottom alignment member **80**. The bottom alignment member **80**, includes a base **82**, a groove engagement segment **84** and a route engagement segment **86**. The base **82**, groove engagement segment **84** and route engagement segment **86** are joined to each other as shown in **FIG. 10**. The base **82** is positionable under the bottom plate **20**. The groove engagement segment **84** is sized to be snugly received in the bottom grooves **22** such that route engagement segment **86** is positioned in the path where the router bit **90** traveled. The route engagement segment **86** is sized to be snugly received within a route **16** of at least one board **12**. If the route engagement segment **86** does not engage all boards **12**, the boards may be held in alignment relative to each other with any clamp, known in the art of woodworking, secured to the boards **12**. The back alignment member **60** is generally removed from the back plate **20** when the bottom alignment member **80** is in use.

[0032] The bottom alignment member **80** allows boards **12** of indefinite length to be routed with jig **10**. The user simply routes through all the bottom grooves **22**, using the back alignment member **60** and removes the back alignment member **60**. Thereafter, the boards **12** are slid through the trough, defined between the front plate **30**, back plate **40** and bottom plate **20**, lining up a bottom groove **22** with a route **16**. The bottom alignment member **80** engages the route **16** holding all the boards **12** in position over the bottom grooves **22** for additional routing. Longer boards **12** require additional sliding of the board **12** through the trough and re-connection of the bottom alignment member **80** in a route **16**.

[0033] The adapter **92** may serve to guide the router bit **90** through the front grooves **32** and bottom grooves **22**. The adapter **92** may including a ring **94**, a body **96**, threading **98** and a groove engagement segment **100**. The ring **94** serves as a force opposing at least a portion of the body **96** to secure the adapter **92** to a router table. The ring **94** connects to the threading **98** and in combination tightens the body **96** to the table. The groove engagement segment **100** is sized to be snugly received in the front grooves **32** and bottom grooves **22** such that the router bit **90** is guided in a straight line along the length of the bottom grooves **22**. The router bit **90** extends through the adapter **92** out through an opening **102** in the groove engagement segment **100**.

[0034] In operation a box joint **14** is formed with the steps of mounting four boards **12** in a jig **10**; routing the boards **12** through a groove **22**; routing the boards **12** through additional grooves **22** until routes **16** have been cut along the entire length of two opposing edges of all four boards **12**; dismounting the boards **12**; and joining the corners of the boards **12** interlacing the routes **16** cut in the boards **12**. The four boards **12** may be simultaneously aligned with either a back alignment member **60** or a bottom alignment member **80**, generally starting with the back alignment member **60**.

[0035] Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize changes may be made in form and detail without departing from the spirit and scope of the invention.

I claim:

1. A box joint jig, comprising:

a bottom plate;

a back plate joined to the bottom plate; and

an alignment member the alignment member structured to orient four boards positioned adjacent the bottom plate for contiguous routing such that the routes on the four boards are positioned to interact forming box joints.

2. A box joint jig, comprising:

a bottom plate, the bottom plate defining bottom grooves;

a front plate joined to the bottom plate, the front plate defining front grooves, wherein the front grooves and bottom grooves are in alignment;

a back plate joined to the bottom plate; and

an alignment member structured to orient four boards adjacent the front and back grooves for a router to cut both sides of a box joint in one cut.

3. The device of claim 2 wherein the bottom plate is fastened to the back plate.

4. The device of claim 2 wherein the bottom plate is fastened to the front plate.

5. The device of claim 2 further comprising handles joined to the back plate.

6. The device of claim 2 wherein the back plate further comprises a guide board, the guide board including visual guides.

7. The device of claim 2 wherein the back plate further comprises an alignment aperture defined through the back plate.

8. The device of claim 7 wherein the alignment member further comprises a fastener and a block, the fastener extending through the alignment aperture and joining to the block.

9. The device of claim 2 wherein the alignment member is a back alignment member.

10. The device of claim 2 wherein the alignment member is a bottom alignment member.

11. The device of claim 2 wherein the alignment member further comprises a groove engagement segment and a route engagement segment.

12. The device of claim 11 wherein the groove engagement segment of the bottom alignment member is sized to be snugly received within the bottom groove.

13. the device of claim 11 wherein the route engagement segment is sized to be snugly received within a route defined in a board.

14. The device of claim 2 further comprising an adapter, the adapter including a groove engagement segment, and the adapted being structured to operably communicate a router bit with boards disposed on the bottom plate.

15. The device of claim 11 wherein the groove engagement segment of the adapter is sized to be snugly received within the bottom groove.

16. The device of claim 2 further comprising at least one board.

17. The device of claim 16 wherein the at least one board is clamped to the back plate.

18. The device of claim 2 wherein the alignment member is removable.

19. A method of forming a box joint, comprising the steps of:

mounting four boards in a jig;

routing the boards through a groove;

routing the boards through additional grooves until opposing edges of both sides of each board have routes disposed along the entire length thereof;

dismounting the boards; and

joining the corners of the boards interlacing the routes cut in the boards.

20. The method of claim 19 further comprising the step of:

using a back alignment member; and

switching the back alignment member with a bottom alignment member to complete the routing of the boards.

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